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**EUROPEAN PATENT APPLICATION**

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⑤4 Cover for trenches.

57) A cover (1) for temporarily covering a trench, e.g. in a thoroughfare such as a road or footpath, by extending over, and resting on the ground on opposite sides respectively of the trench, the cover (1) being releasably engageable with other adjacent covers (1a and 1b) by means of male members (5 and 5b) mating with respective corresponding female

members (6a and 6) in such a manner that when the covers (1, 1a and 1b) are engaged in a ground resting position to form an assembly (7) of covers, one cover (1b) of the assembly can be disengaged from the adjacent cover (1) only by moving the cover (1b) out of the general plane of the assembly.



**EP 0 431 777 A1**

## COVER FOR TRENCHES

This invention relates to a cover for temporarily covering a trench in a thoroughfare such as a road or footpath, e.g. overnight until work restarts.

It is important that temporary trench covers can be laid and removed quickly and easily for re-use. Trench covers are already in use which consist in elongate plates, usually of steel, which are laid over the trench with the covers being supported by the ground on opposite sides of the trench. Normally a number of such plate covers are used, with the oppositely facing ends being in abutment. The problem with such plate covers is that, even though they are relatively heavy they can be moved lengthwise and transversely of the trench by vibration imparted by the movement of traffic (vehicles or people) over the plate covers which can result in dangerous gaps occurring therebetween and consequently the possibility of accidents. If the transverse movements are too great there is the risk that one or more plate covers will be tipped into the trench. In order to minimise these movements, the work persons can either inset the covers in the road or path surface or use rubble or asphalt to provide stops. Even when such precautions are taken, these plate covers can still be worked loose, e.g. by heavy vehicular traffic.

Permanent covers for trench drains are known from U.S. Patent Specification No. Re. 26,366. Such covers are in the form of grates to allow water to pass therethrough into the drain and are inset into the top of the drain where they rest on metal framing to be flush with the surrounding drained area. Each cover comprises several individual grates which are arranged side by side lengthwise of the drain with one end of each grate being supported on the metal framing by an outwardly projecting lip and with the other end of each grate being supported by means of two lateral lugs extending from opposite sides respectively of each grate and engaging in correspondingly shaped notches of each two adjacent grates, with the lugs and notches lying within the general plane of the grates. At each end of the cover, a respective lateral lug engages on the framing to support the ends of the cover. Assembly and disassembly is by longitudinal movement into lug and notch engaging and disengaging positions. A removable key grate without lugs and notches is used to lock the whole assembly in position. Without the framing and key grate the individual grates would move lengthwise, thus making this cover unsuitable for a temporary trench cover as it would suffer from the same disadvantages of the known trench covers.

The same applies to the permanent floor covers described in the specification of US Patent No.

1,334,222 which relates to an interlocked parquet flooring system that is assembled by means of longitudinal interlocking movement. If an assembly of individual blocks were used without the surrounding strip as a temporary cover for a trench, then longitudinal vibration engendered movements could occur between the individual blocks.

The main object of the present invention is to provide a cover for temporarily covering a trench and in which the aforesaid disadvantages are minimized or avoided.

To this end and from one aspect the present invention consists in a cover for temporarily covering a trench, e.g. in a thoroughfare such as a road or a footpath, by extending over, and resting on the ground on opposite sides respectively of, the trench, the cover being releasably engageable with another adjacent cover in such a manner that when the covers are engaged in a ground resting position to form an assembly of covers, one cover of the assembly can be disengaged from an adjacent cover only by moving a cover out of the general plane of the assembly.

By means of the invention, once several interengaged covers are in the assembled position over a trench, lengthwise movement of the covers relatively to each other is minimised and therefore longitudinal release is avoided.

Thus, the problem of vibration engendered dangerous gapping between the ends of adjacent conventional covers can be prevented. Naturally, the nature of the releasable engagement is such that some lengthwise relative movement can occur between the adjacent covers in the assembly.

Advantageously, the releasable engagement also prevents or minimises vibration engendered lateral movements occurring between adjacent covers of the assembly.

In order to prevent a cover assembly from falling into a trench, by the movement of the traffic causing one side to tip into the trench, and to provide for greater versatility in use, the releasable engagement means is preferably of sufficient width that, no matter how far the cover assembly is pushed in any one lateral direction, the side of the releasable engagement on one side of the trench will abut against the trench wall on that side before the opposite side of the cover assembly is pushed clear of the adjacent wall of the trench on that opposite side. Of course, this means, as some trenches will be wider than others, that the width of the cover must be suitable for the particular width of the trench.

In other words, the distance between the lateral edge of the cover and the wall of the trench on one

side should be chosen to be greater than the distance between the wall of the trench and the releasable engagement on the other side.

Whilst in the invention defined above, any cover, i.e. an intermediate or end cover, can be picked up to release it from adjacent covers, preferably to improve security for example, the nature of the releasable engagement is such that one cover can only be disengaged from the adjacent cover by picking up a cover at a free end of the assembly, it being impossible to remove a cover from an intermediate position in the assembly.

Accordingly, from another aspect, the present invention consists in a cover for temporarily covering a trench by extending over, and resting on the ground on opposite sides respectively of, the trench, said cover including a cover member provided with releasable engagement means comprising male and female latching members depending from opposite end regions respectively of the cover member.

Preferably the male latching member is a hook-shaped lug which mates with a female latching member in the form of an apertured lug on an adjacent cover. The aperture may be a slot or a laterally opening recess.

As will be appreciated, the height of the aperture is such that the free end of the hook can be passed through the aperture to latch or unlatch the hook shaped lug from the aperture of an apertured lug on an adjacent cover and is conveniently disposed so that a hook portion of the hooked shaped lug lies adjacent or touches the bottom of the aperture and abuts against an outer surface of the apertured lug.

In order to release an end cover from an adjacent cover, i.e. unlatch the hook-shaped lug from its enlatchment with an apertured lug of the adjacent cover, the cover member is provided with a key hole which can be engaged with a lifting hook to lift the end cover out of the general plane of the cover so that the free end of the hook-shaped lug can be pulled through the aperture in the apertured lug and the cover lifted away from the trench.

To enable a narrower width cover to be positioned over a slightly wider trench than usual, whilst still preventing a cover assembly from tipping into the trench, the apertured lug is preferably shaped laterally to receive spacer elements to laterally extend the width of the lug. The lateral shaping may be recesses, eg in the form of grooves which receive tongues on the spacer elements.

The covers which are conveniently of rectangular shape may be made in a number of widths, e.g. 160 mm, 190 mm and 220 mm to cater for different widths of trench. Ideally the width of the cover should be no more than 40 mm greater than the width of the trench. Whilst the length of the

covers can be as desired, a suitable length is 500 mm.

The cover may be made of any suitable material, such as steel, consistent with providing the requisite strength to support heavy vehicles passing over it: but preferably in order to reduce weight and protect any metal from corrosion, e.g. steel from rusting, the whole cover including the cover member and the releasable engagement is made of metal reinforced plastics.

Thus, in a preferred embodiment the cover has a pressed-steel core or base around which the plastics material is moulded, with the cover member being preferably of corrugated shape to increase strength.

To facilitate the passage of traffic over the cover assembly, the cover advantageously has tapering lateral edges to form ramps, and optionally to increase grip, the cover is provided with a tread pattern on its top surface.

The tread pattern may have variations in depth.

In order that the invention may be more readily understood, an embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a plan view of a cover for temporarily covering a trench, and made in accordance with the present invention,

Fig. 2 is a left-hand end view, as illustrated, of the cover of Fig 1, and positioned in a trench in a road,

Fig. 3 is a longitudinal section taken along the line III - III of Fig 1.,

Fig. 4 and 5 are detail plan and end views to an enlarged scale showing the surface tread pattern of the cover of Fig. 1, and

Fig. 6 is another detail view illustrating variations in the depth of tread.

Referring to the drawings, there is shown a cover which is generally indicated at 1 for temporarily covering a trench 2 e.g. in a road 3, by a cover member 4 thereof extending over, and resting on the ground on opposite sides respectively of the trench. The cover 1 is releasably engageable with other adjacent covers 1a and 1b, partly shown in chain lines in Fig. 3, by means of male and female latching members in the form of hook-shaped and apertured lugs 5 and 6 respectively to form an assembly of covers 7 of which one cover of the assembly can be disengaged from an adjacent cover only by moving a cover out of the general plane of the assembly.

The lugs 5 and 6 (Fig. 3) depend from opposite end regions 8 and 9 respectively of the cover member 4. The cover member 4 has tapering lateral edges forming ramps 10 to facilitate the passage of traffic over the cover when in position covering a trench. To facilitate grip, the top surface

of the cover member 4 including the ramps 10 and the area 11 lying between the ramps is provided with a tread pattern 12 which is at a minimum as indicated by the reference 13 and at a maximum, as indicated by the reference 14.

Referring more particularly to Fig. 3, the cover has a pressed steel base or core 15 extending throughout the cover member 4 and the lugs 5 and 6, with the base 15 in the region of the cover member 4 being corrugated to increase strength. Around the entire base 15 a plastics material 16 is moulded with the plastics material providing the ramps 10 and the tread pattern 12.

The hook-shaped lug 5 has a straight portion 20 depending perpendicularly from the end region 8 and a hook portion 21 projecting outwardly beyond the end region 8. Depending perpendicularly from the other end region 9 of the cover member 4 is the apertured lug 6 whose aperture is in the form of an elongate slot 22 extending transversely of the cover 1, as will be apparent from Fig. 2. The aperture 22 has a height such as to allow the cover 1 to be engaged with another such cover in a manner to be described. Moreover, on opposite sides respectively of the slot 22 the lug 6 has lateral recesses in the form of grooves 23 for receiving the tongues 24 of at least one spacer element (only one shown in chain lines at 25). The or each spacer element laterally extends the width of the lug 6 to enable a narrower width cover to be positioned over a slightly wider trench than usual, as indicated by the chain lines 26 to avoid the cover from being tipped into the wider trench.

To facilitate lifting of the cover 1, a key hole 27 is provided in the cover member 4 adjacent the end region 8 with the hook-shaped lug 5, for use with a lifting hook (not shown).

In order temporarily to cover the trench 2 shown in the road 3 (see Fig. 2) the width of the covers 1 1a and 1b is chosen such that the distances (y) between the edge or wall of the trench and the edge of the cover on one side is greater than the distance (z), between the side 28 of the lug 6 and the edge or wall of the trench on the other side. If these distances are not right then one or two spacer elements 25 can be used. Then the cover 1 is brought to the trench and the end region 8 tilted downwards so that the hook portion 21 of the hook-shaped lug 5 can be passed through the aperture 22a in the lug 6a. The end region 9 of the cover 1 is lowered so that the horizontal part 29 of the hook portion touches, or lies close to the bottom of the aperture 22a and the vertical part 30 of the hook portion 21 abuts against the lug 6a beneath the aperture 22a to latch the two covers 1a and 1b together.

It will be appreciated from Fig. 3 that any attempt to remove the cover 1 from its engagement

with the cover 1a, in a longitudinal direction, will be impossible. It is only by inserting the lifting hook in the keyhole 27 and lifting the vertical part 30 of the hook portion 21 of the lug 5 clear of the bottom of the aperture 22a that the hook portion can be released to permit the cover 1 to be unlatched and pulled clear of the cover 1a. This release or unlatching action as well as the latching action is permitted by the aperture 22a being of sufficient height.

The last cover 1b having a hook-shaped lug 5b which mates with the aperture 22 of the cover 1 is then latched to the cover 1 in a similar manner to that described for covers 1 and 1a, to complete the cover assembly 7 for covering the trench 2. The nature of the interengaging lugs is such that only small non-dangerous gaps 31 are left between the adjacent ends of the covers. It will be apparent from Fig. 3 that the intermediate cover cannot be moved in view of the enlatchment of the lugs 5, 6a and 5b, 6. It is only possible to remove the covers from one end of the assembly, that being the end in which an apertured lug is at the end of the cover assembly, in this case apertured lug (not shown) of the cover 1b. Thus the cover 1b is unlatched from the cover 1 in the same manner as the cover 1 was unlatched from the cover 1a.

Although a particular embodiment has been described it should be appreciated that modifications and variations may be made which do not depart from the scope of the invention. For example, instead of the cover being of oblong shape, it could be square. Also, the shape of the mating lugs 5 and 6 could be varied, for example, by having an upwardly facing hook-shaped lug constituting the female member which depends from, and projects beyond, one end region of the cover, and of which the hook is engageable by a plate-shaped lug, constituting the male member, depending from the other end region of another such cover. The upwardly facing hook-shaped lug could be of channel form with the plate-shaped lug engaging in the channel or the upwardly facing hook-shaped lug could have an aperture, eg a slot, in which the plate shaped lug engages.

#### Claims

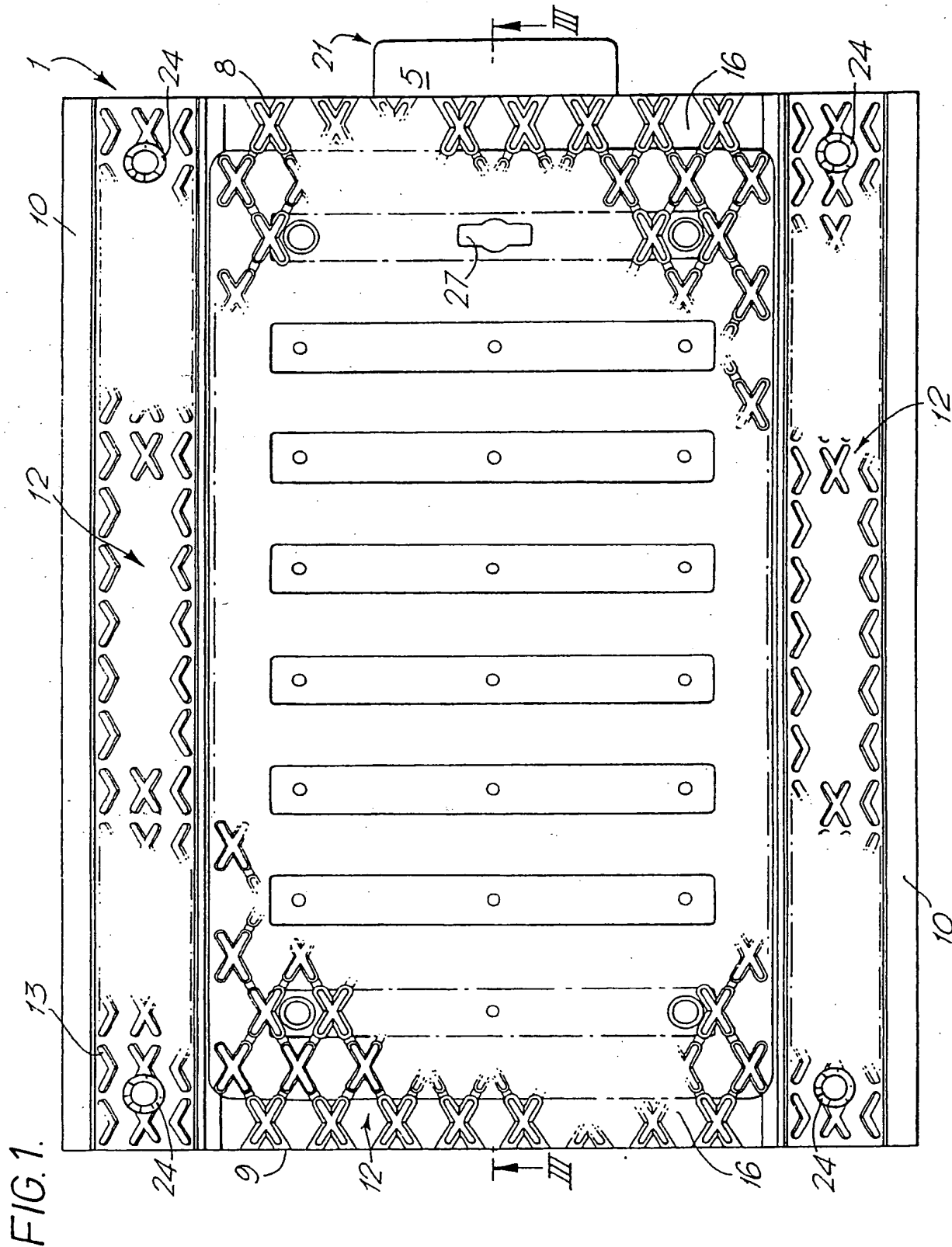
1. A cover for temporarily covering a trench, by extending over, and resting on the ground on opposite sides respectively of, the trench, the cover being releasably engageable with another adjacent cover in such a manner that when the covers are engaged in a ground resting position to form an assembly of covers, one cover of the assembly can be disengaged from an adjacent cover only by moving a cover

out of the general plane of the assembly.

2. A cover as claimed in claim 1, wherein the releasable engagement minimises vibration engendered lateral movement occurring between adjacent covers of the assembly. 5
3. A cover as claimed in claim 1 or 2, wherein the nature of the releasable engagement is such that one cover can only be disengaged from the adjacent cover by picking up a cover at a free end of the assembly, whereby any cover occupying an intermediate position in the assembly cannot be removed. 10
4. A cover as claimed in any one of claims 1 to 3, wherein the said cover includes a cover member and wherein the releasable engagement comprises male and female latching members depending from opposite end regions respectively of the cover member. 15
5. A cover as claimed in claim 4, wherein the male latching member is a hook-shaped lug for mating with a female latching member in the form of an apertured lug on the cover member of an adjacent cover. 20
6. A cover as claimed in claim 5, wherein the height of the aperture is such that a hook portion of the hook-shaped lug can be passed through the aperture to latch or unlatch the hook-shaped lug to or from the apertured lug on an adjacent cover. 25
7. A cover as claimed in claim 5, wherein the hook portion of the hook-shaped lug can lie adjacent or touch the bottom of the aperture and can abut against an outer surface of the apertured lug of an adjacent cover when the cover is engaged therewith. 30
8. A cover as claimed in any one of claims 1 to 7, wherein the distance between a lateral edge of the cover and a wall of a particular trench, on one side can be chosen to be greater than the distance between that side of the releasable engagement and that wall of the trench on the other side. 35
9. A cover as claimed in any one of claims 1 to 8, wherein the width of the releasable engagement means can be laterally extended. 40
10. A cover as claimed in claim 9 as appendent to claim 4 or any claim dependent thereon, wherein the female latching member is shaped to receive spacer elements to laterally extend 45

the width of the releasable engagement.

11. A cover as claimed in claim 10, wherein the male latching member is shaped with lateral recesses to receive tongues of the spacer elements. 50
12. A cover as claimed in any one of claims 1 to 11, and provided with a key hole which can be engaged with a lifting hook to disengage the cover from an adjacent cover. 55
13. A cover as claimed any one of claims 1 to 12, and made of metal reinforced plastics.
14. A cover as claimed in claim 13, wherein the metal reinforcement is a pressed-steel base around which the plastics material is moulded.
15. A cover as claimed in any one of claims 1 to 14, wherein the cover has tapering lateral edges to form ramps.
16. A cover as claimed in any one of claims 1 to 15 and having a top surface provided with a tread pattern.
17. A cover as claimed in claim 16, wherein the tread pattern has variations in depth.
18. A cover for temporarily covering a trench, substantially as hereinbefore described with reference to Figs 1 to 6 of the accompanying drawings.





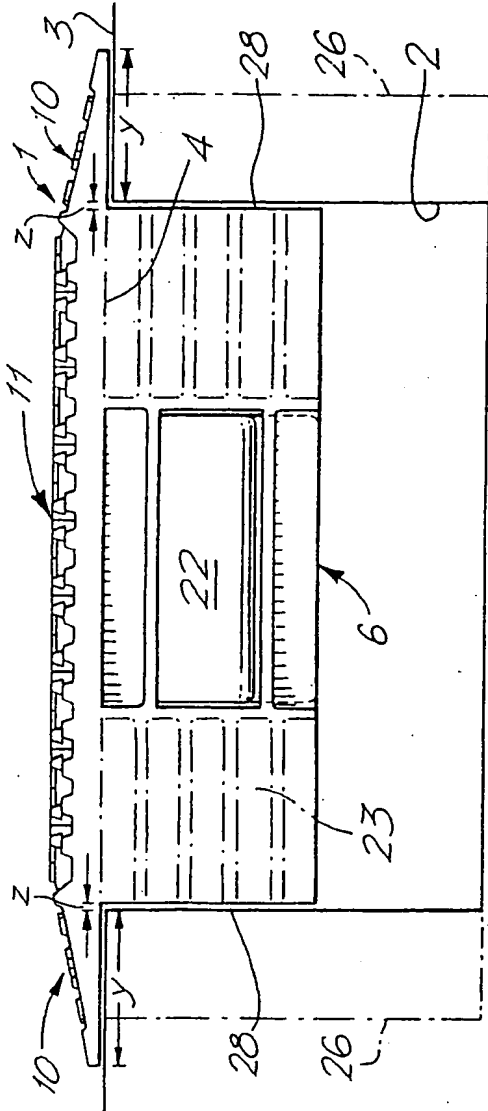


FIG. 2.

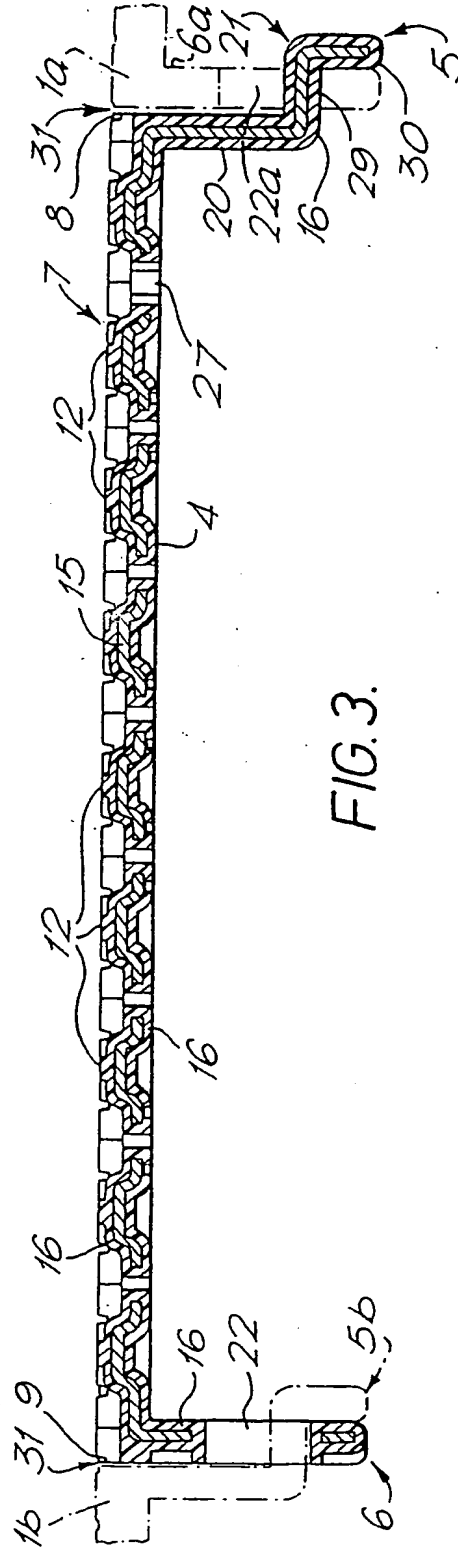
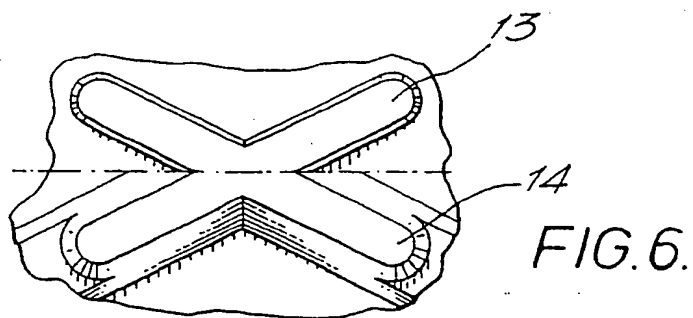
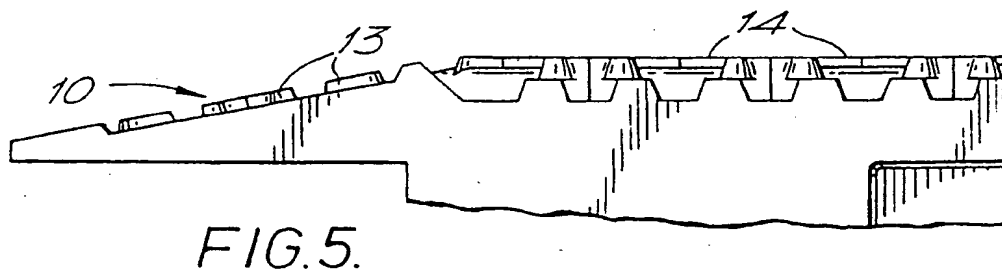
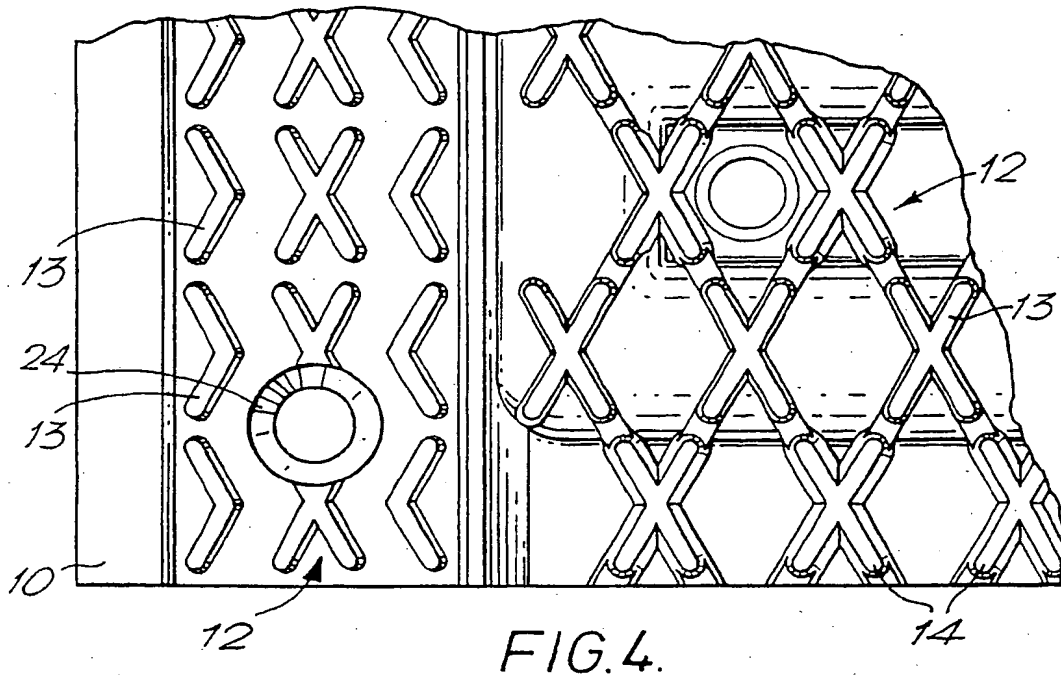


FIG. 3.





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# EUROPEAN SEARCH REPORT

Application Number

EP 90 31 2505

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 035 594 (PASSAVANT WERKE) * Claims 1-3; figure 1 *	1-3	E 03 F 5/06 E 01 C 9/08
X	FR-A-8 657 07 (MARCHANT) * Abstract point 2; figures 1,2a *	1-7,16	
X	DE-C-1 845 9 (REDDALL) * Whole document *	1-7	
A,D	US-E-2 636 6 (FLEGEL) * Whole document *	1-4	
A	EP-A-0 147 050 (NEWTON) * Claim 7; figure 4 *	12	
A	FR-A-2 581 587 (ALLIBERT) * Page 3, lines 13-27; figure 2 *	13,14	
A	GB-A-1 249 914 (BURGESS) * Whole document *		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 03 F 5/00 E 02 D 29/00 E 01 C 11/00 E 01 C 9/00
The present search report has been drawn up for all claims			
Place of search		Date of completion of search	Examiner
The Hague		19 February 91	FORDHAM A.K.
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